

South Africa and Climate Change **An ambitious target that needs an action plan !**

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Our planet is undergoing a warming trend over and above natural and normal variations. The Earth has already warmed an average of 0,8 degrees Celsius above its level in 1750, with the most rapid rise occurring since 1970. Most scientists believe this is largely due to human activities associated with large-scale manufacturing and human consumption. Humans use energy mainly for light, heat, mechanical work and motive power and since the industrial revolution; all these energy functions have been powered primarily by fossil fuels that emit carbon dioxide.

The increased release of greenhouse gases over the last century has resulted in a rapid rise in global temperatures during the late twentieth century. Prior to the Industrial Revolution the level of carbon dioxide in the atmosphere stood at about 280 parts-per-million, and had been stable at around that level for thousands of years before that. In 2007 the CO² level in the atmosphere stood at 384 parts-per-million and is climbing at a rate of 2 parts-per-million a year.

Based on current science, if the total human influence on the atmosphere reaches 550 parts per million of CO², which is where it is heading by mid century, this will cause an approximate 3 degree Celsius rise in global average temperature. However, if we manage to cap the changes to 450 ppm of CO² this will result in an approximate 2 degree Celsius rise in global average temperature. There is increased concern that a 3 degree rise will not be tolerable and that capping CO² emissions at a 450ppm rate would be much more favourable.

As the Earth's temperature continues to rise, we are leaving an era when climate change was manageable and reversible, including acid rain, ozone depletion and conventional pollution; and entering a new era in which weather patterns seem less predictable and our effects on the climate are becoming potentially unmanageable and irreversible. Hence there is much talk of 'global wierding' – ie weather patterns are stranger and more dramatic. One of our first examples of this was Hurricane Katrina which, on August 29, 2005 smashed into New Orleans. The United Nations sponsored Intergovernmental Panel on Climate Change, in its 2007 report stated that without a dramatic reduction in human-induced CO² emissions, climate change may bring abrupt or irreversible effects on air, oceans, glaciers, land, coastlines and species. Panel chairman Rajendra Pachauri told reporters that "if there is no action before 2012, that's too late. What we do in the next two or three years will determine our future and this is a defining moment."

At very least it would seem that action needs to be taken to address the rampant and insatiable demand for energy and how we produce that energy and the resultant carbon emmissions. Rochelle Lefkowitz, president of Pro-Media Communications coined the phrases "fuels from hell" which refer to coal, oil and natural gas which all come from underground, are exhaustible and emit CO² and other pollutants when burned. In contrast are "fuels from heaven" including wind, hydroelectric, tidal, biomass and solar power which come from above the ground, are renewable and produce no harmful emissions. The shift to 'clean

energy' generated by 'fuels from heaven' seems a fundamental paradigm shift that must be made.

However, there are a number of dissenting views on climate change which believe that the whole global warming panic will go the way of the 1970's global cooling panic. While most scientists can agree that the planet is warming, the debate continues around its potential impact and whether human intervention can affect it.

Some environmental advocates accuse the most vocal climate skeptics of being "in the pocket of the fossil fuel industry. However, some flaws in the science of climate change activists have been brought to the fore by sceptics. Sceptics question the accuracy of the scientific findings of climate change experts, even questioning if it is being caused by human actions at all.

Researchers point to current events--such as rapidly melting polar ice caps and glaciers, declining mountain snow cover, reduced freshwater levels, an upswing in extreme weather events, and rising sea temperatures--as just some of what to expect from the consequences of climate change. However, skeptics like Danish environmental economist Bjorn Lomborg believe the catastrophic consequences of a warmer planet have been overemphasized. In Lomborg's book, *Cool it: The Skeptical Environmentalist's Guide to Global Warming*, he argues, "climate change is not an imminent planetary threat that will bring down civilization," but instead one of many problems that will need to be dealt with this century and beyond.

Some other skeptics assert that changing the environment back is not economically feasible. "Natural climate change is a hazard that--like other similar natural hazards--should be dealt with by adaptation," Robert M. Carter, a climate researcher at James Cook University, Townsville, Australia, told a U.S. Senate panel in early 2007. "Attempting to mitigate human-caused climate change is an expensive exercise in futility. Skeptics assert that attempts to address climate change, such as caps on greenhouse-gas emissions, could cause more economic harm than environmental good.

Most policy makers agree that if society decides to act it will have the capacity to meet the targets it sets to avoid catastrophe. If just three global powers (China, US and the EU) decide to act, a full 50% of global climate gas emissions will be covered. If we add an additional 4 countries (Russia, India, Japan and Brazil) the coalition will control 67% of global emissions. However, the US has not made any concrete commitments to decreasing its emissions and it would seem that it needs a few more large scale environmental catastrophes, larger than that of Hurricane Karina, to take climate change seriously. China on the other hand, seems to be responding to environmental concerns, and has just passed some far reaching laws to reduce the projected carbon emmissions in 2020 by 40%. These reductions will not be from 2010 levels – when the commitment was made – but from where emissions would expect to be in 2020 if no carbon mitigation was done. This is a very bold objective, and China is happy to accept that the consequences on their economic growth projections will result in a 2% lower growth target for 2020 than originally expected. Whether Chinas insatiable energy requirements to feed its growth can be done within these bold targets is yet to be seen. However their intention is very clear – they are taking global warming seriously.

The Shell Energy Scenarios to 2050 express that “never before has humanity faced such a challenging outlook for energy and the planet that can be summed up into ‘more energy, less

carbon dioxide.” To help think about the future of energy, Shell has developed two energy scenarios that describe alternative ways it may develop. In the first scenario, called Scramble, policymakers pay little attention to more efficient energy use until supplies are tight. Likewise, greenhouse gas emissions are not seriously addressed until there are major climate shocks. In the second scenario, called Blueprints, growing local actions begin to address the challenges of economic development, energy security and environmental pollution. A price is applied to a critical mass of emissions giving a huge stimulus to the development of clean energy technologies, such as carbon dioxide capture and storage, and energy efficiency measures. The result is far lower carbon dioxide emissions, and in Shell’s view, the best hope for a sustainable future.

The latest developments out of the Cancun global agreement on climate change in December 2010 were positive in that they set up a \$100-billion a year green fund to aid developing nations meet their climate change objectives. It is now up to South Africa to drive the climate change agenda forward with the next climate change conference to be hosted by Durban in 2011 ahead of the expiration of the Kyoto Protocol in 2012.

Although South Africa is a relatively small country with low CO² emissions levels relative to the global problem, we contribute more than 30% of Africa’s emissions. South Africa’s per capital green-house gas emissions are as much as the UKs and close to Germanys, despite being a smaller economy. The country has committed itself to reduce its greenhouse gas emissions by 34% by 2020 and by 42% by 2025 - off 2009 levels and from where emissions would expect to be in 2020 if no carbon mitigation was done.

South Africa’s commitment to an ambitious target will be good for the country’s competitiveness in the long run, but will be difficult to implement in the commercial and macroeconomic reality. However, SA’s commitment depends on the provision of financial resources, the transfer of technology and capacity building support by developed countries. Developed countries are to provide \$30-billion in financial incentives for 2010-2012 and the \$100-billion annually by 2020 that was agreed to at Copenhagen. It is still unclear as to whether developed countries are still able to honour these commitments despite the lingering global economic crisis. Although SA has committed to an ambitious target, how it will meet these targets in reality is still vague.

Disincentives for greenhouse gas emitters, like a carbon tax has been promised by National Treasury. Last month, the Minister of Water and Environmental Affairs Ms Edna Molewa released the National Climate Change Response Green Paper 201 for public comment. The Green Paper does not provide individuals with details on their legal obligations relation to climate change, but rather defines an ultimate policy objective and identifies certain principles and strategies to be utilized to achieve the objective.

However, the document does state that South Africa will require a mandatory submission of greenhouse gas emission data to the National Atmospheric Emission Inventory by all significant emitters and compilers of greenhouse gas emission related data by 2013.

The draft Green Paper also includes references to specifically anticipated legal interventions, including:

- The revision of the Minimum Requirements for Landfill by 2012;
- The compilation of a national composting strategy by 2012 aimed at reducing the amount

of organic waste to landfill by 50% of the 2000 baseline by 2020;

- The use of section 29(1) of the National Environmental Management: Air Quality Act (No. 39 of 2004), which deals with priority air pollutants, to manage greenhouse gas emissions from all significant industrial sources, i.e., sources responsible for > 0.1% of total emissions for a specific industrial sectors, in line with improved mitigation plans prepared by identified industries and / sectors.

The Department of Energy is also developing the second Integrated Resource Plan which will determine what SA's energy mix will be for the next 25 years. In addition, international environmental regulations are coming thick and fast with some 250 new regulations coming into effect internationally in less than a year.

In general, SA has a dirty economy, given its historic dependence on cheap coal to generate electricity. It is estimated that the SA economy emits 500 Mt of CO² in a year. 45%, or 225 Mt/year is emitted by Eskom in the production of electricity – 95% of which is produced by coal. In order to reach the target, Eskom will need to dramatically alter its energy mix to include wind, solar and nuclear power. All this will push the price of electricity up and society will need to pay the true cost of clean energy. SA has been described as the US of Africa in industrial strength. SA produces nearly 40% of Africa's CO² emissions, but is also critical in providing energy to the sub-continent. Balancing the need to cut high emissions with the demands for electricity to drive development is one of SA's greatest challenges.

As SA follows a greener path, new green industries could provide jobs for the countries large unemployed population. It is expected that green technologies are likely to create an investment boom similar to railways, cars and information technology in previous centuries. The global market for environmental products and services is projected to already be worth \$5-trillion in goods and services, according to Peet du Plooy, the World Wildlife Fund for Nature's trade and investment adviser in SA. If SA had a 0,7% share of this global market, it would be worth more than R250-billion, or 14% of GDP at 2009 levels.

The alternative energy market is also labour-intensive, with a high potential for local supply and is growing globally. It is estimated that internationally 2,3-million people have already found jobs in the renewable energy sector, and employment in alternative energies may rise to 2,1-million in wind and 6,3-million in solar power by 2030. Locally, Economic Development Minister Ebrahim Patel has declared green jobs as a key to rolling back SAs 30% unemployment rate. Construction of Eskom's planned solar farm in Upington is expected to get underway in 2012 at a cost of between R6-7-billion. The 5 000 megawatt solar energy park, which will be the world's largest if built could create as many as 12 300 jobs. There is also talk of wind energy and algae-based biofuels in the Western Cape.

Gauteng province has produced its own Strategy for a Green Economy this year which envisages the creation of among others, 148 000 new jobs in the alternative energy sector, up to 70 000 jobs in biofuels, 10 000 jobs in energy efficiency industries and 7 000 jobs in rolling out the government's plans for 1-million solar heating panels for homes.

While this may materialise, all of SA's existing industrial policy objectives will have to be re-evaluated against the new low-carbon trajectory. Our existing industrial policy plans are to take minerals out of the ground and beneficiate them. But this may not be possible in a low carbon future, so all our growth plans will have to be reassessed. South Africa faces many difficult challenges at home including high levels of poverty, inequality and joblessness. We

also need to increase the delivery of basic services such as water, sanitation, housing and electricity to those who still do not have access. The SA economy needs to grow for these challenges to be met, but it is clear that it cannot grow in its usual form, but requires a shift to a low-carbon economy. This will require the development of new models and measures for growth. A paradigm shift is required to see whether protecting the environment and growing our economy, which seem now mutually exclusive, can operate together.

There is a misconception that switching to more sustainable technologies will significantly harm GDP and hamper growth. This misconception is preventing many countries from making significant commitments to climate change action. In contrast, SA has committed to ambitious CO₂ emission reduction targets and research has shown that a fair amount of the mitigation action proposed will make a contribution to the economy, rather than costing the economy money. To follow SA's most ambitious mitigation scenario would cost on average 0,11% of GDP, according to Andrew Marquard of the University of Cape Town's Energy Research Centre. This 0,11% is the amount of extra resources going into the energy sector to make it more sustainable. Many of the mitigation measures, such as installing solar water heaters will cost money upfront, but save money in the long run. The damage that would be done would be to the coal industry, which is inherently unsustainable in a clean energy world. Having said this, the mining industry is working hard to find ways to ensure that coal powered energy is cleaner.

South African companies need to start taking steps to reduce CO₂ emissions in order to stay in step with their international trading partners and remain competitive. With carbon tax and mandatory reporting on carbon emissions on the way, companies need to start urgently addressing the likely affects of climate change. SA currently has 38% of its green house gas emissions coming from exports. This is due to a reliance on extractive industries and large metal beneficiation projects. These industries are vulnerable to border tax adjustments that are being considered by SA's trading partners, such as the US, France and Germany. This trend strengthens the argument for a carbon tax to be instituted at home as a pre-emptive measure enabling our government to raise revenue instead of other governments. However, with China growing as SA's largest trading partner, perhaps the importance of remaining competitive with its other trading partners is diminishing?

Local climate change sceptic Dr Philip Lloyd, a chemical engineer and nuclear physicist and consultant to the energy sector does not believe that carbon taxes are the way to go as they do not have the desired effect of changing behaviour and only make governments richer.

Recommendations for business

According to the Carbon Disclosure Project, business faces a number of risks from climate change, such as costs associated with regulatory measures, shifting and uncertain rainfall patterns; increased frequency of extreme weather events which could damage infrastructure and disrupt supply chains, and changes in consumer attitude and demand. Local examples include sugar manufacturers from Kwazulu-Natal which are moving their operations to Mozambique and Zambia where water supplies are more secure than in dry land farming.

Mining

The SA mining sector employs over a million people and supports 7-10 dependents per miner. It provides between 15-20% of GDP, about 70% of the country's energy and is by far the largest net generator of foreign exchange. However, it uses about 6% of the country's

water supply, has low levels of water recycling and acid mine drainage is leaching toxins into SA's groundwater. The mining industry will be challenged by SA's growing water shortages as well as energy supply challenges which will mean that new projects need to be designed to account for tomorrow's limitations. Companies in the extractive industries will need to rethink their business model and extend up or down the value chain. Extractive companies could add renewable power or co-generation to their existing mines in order to self-supply electricity which would secure their own power supply and make them investors in renewable energy.

Energy

The backbone of the country's economy is the minerals-energy complex, the vertebrae of which are Eskom and Sasol. Energy supplied by these two accounts for 45% of the country's total greenhouse gas emissions. Their key sustainability concerns are CO² emissions, water consumption and pollution related to the mining, burning and processing of coal. SA has been dependent on cheap electricity as a basis for its economic competitiveness. Shifting some of our dependence from coal-fired power to renewable energy sources such as solar and wind power would not only help to reduce emissions, but also address some of the challenges of energy security, job creation and poverty alleviation. If SA shifts 15% of electricity production to renewable sources by 2020 it is estimated that it might-be able to create 36 400 new direct jobs and over 100 000 indirect jobs. The renewable energy potential for large-scale wind and solar thermal power in SA has been assessed significantly by local universities. Wind power and concentrated solar power clearly do have the potential to contribute significantly to SA's electricity supply by 2030. An ambitious renewable energy plan, in conjunction with appropriate investments on the demand side, will create more than twice as many jobs as conventional energy scenarios. A recent comparison of energy-generation costs revealed that wind energy cost 1.27 times more than the least cost option; nuclear is 3,51 times more expensive and solar options are about 4,6 times more expensive, although further cost drops are expected.

Despite these good predictions for local renewable energy production, Dr Lloyd believes that nuclear fuel remains a viable option for South Africa's energy needs. The anti-nuclear lobby's biggest argument is the risk posed by waste disposal and Lloyd says they're "absolutely dead right, there is no such thing as a perfect system". This is not a sufficient reason to ban nuclear energy, though. "The central fact is we can do many things with a very, very high risk," he says. It's all about managing the risk. Nowadays long-term storage of high-level waste is considered so safe that two villages in Sweden are fighting for the right to have such a storage facility on their doorstep because of the long-term jobs created. On the Highveld, he says, "we happen to have one of the best geologies (for storing nuclear waste) in the world, 3000 million years old, and it's been undisturbed for all that time". It would make an ideal repository. "It's free of all sorts of volcanoes and earthquakes; we know its geology intimately because it's immediately underneath the gold mines."

Manufacturing

Manufacturers need to begin applying energy efficiency measures to reduce greenhouse gas emissions where possible. In using less electricity while maintaining overall output, manufacturers can lower their carbon footprint. To overcome the energy supply crisis for energy-hungry industries like smelting, Eskom needs to develop base load capacity where power stations run around the clock rather than switching on and off around peak periods.

Transport

SA's transport sector, which contributes 13% to CO² emissions, largely due to the burning of fossil fuels, also has opportunities for mitigation action. There should be a shift from road-based transport to rail-based transport, a prioritisation of investment in public transport and a move to manufacture SA's first electric car. Again, all these initiatives present our economy with enormous opportunities for economic growth and job creation while serving to help the country meet its emissions targets.

Retail & FMCG

The retail sector will need to factor into its future strategies the growing constraint on resources and ecosystem services which will present risks for business. Constraints on water supplies, energy and human rights issues could all affect retail products going forward. Many large forward thinking retailers are already trying to get involved in helping to avoid challenges by removing alien trees from water sources, producing food and beverages in a sustainable manner, and decreasing their transport related emissions. Suppliers and retailers also need to look into greening their buildings to be more energy efficient in terms of lighting, heating and refrigeration.

Unilever is a recent example of the second-biggest consumer goods company in the world which has released a strategy that puts sustainability at the heart of its global operations. The company plans to halve the environmental impact of its products while doubling sales over the next 10 years. It will source 100% of its agricultural supplies from sustainable sources and link more than 500 000 smallholder farmers and small scale distributors in developing countries to its supply chain. CEO Paul Polman said it is the only way to do business long term that there is no conflict between sustainable consumption and business growth.

Insurance & Financial services

Insurance companies could find the need to raise their estimates for future premiums due to the worsening effects of climate change. Firms that operate in areas where natural disasters are on the increase and cause a growing amount of damage are likely to see the cost of cover rise by as much as 100% in the next 10 years, according to the Association of British Insurers. There are fears that the consequences of changes in weather patterns have been underestimated by the insurance industry and worsening weather could cause the loss of billions of Rands in the future. In the past, insurance companies quantified risk by looking at historic trends like flood activity over the past 50 years, and then modelling it in the future. But in a fast-changing world with population migration and climate change, past trends become less relevant. Companies with operations in higher risk areas will be worst affected by higher insurance premiums. Governments are also at risk as worsening weather could affect government-owned infrastructure.

The financial services sector can reduce its environmental impact by increasing energy efficiency in all its buildings and vehicle fleets. However, the largest sustainability impact will relate to where the sector directs its investments. The Equator Principles were established in 2003 as part of a global initiative to steer banking towards environmentally and socially responsible decision-making. By signing up to these voluntary principles, banks agree to adhere to sustainability principles set out in the International Finance Corporation performance standards. Signatory banks can measure the possible environmental and social consequences of a proposed development against these standards and look for ways to mitigate negative impacts.

Healthcare

The largest challenge to the healthcare sector is to try and shift from curative health to preventative healthcare. Trying to treat your way out of epidemics is unsustainable and we need to get to a place where we are preventing disease rather than treating it. This requires a policy change in health education at schools and clinics to focus on healthy lifestyles, exercise and good foods.

IT & Telecoms

IT and telecoms companies have a large role to play in an increasingly warm climate. While natural environmental elements become more hostile, IT and telecoms can help business continue operating across the world without the need for real-life presence. Teleconferencing facilities can reduce travel as more aeroplanes are grounded due to worsening weather in the future. As networks and bandwidth become more efficient and affordable and the IT network becomes better equipped to handle data-heavy video, these methods of conducting business will become more mainstream. The chief risks to the sectors are the energy crisis and the management of e-waste. However, implementing energy-efficient IT systems and practices in a business can bring down a company's total energy bill as much as 7%.

Regarding e-waste, companies need to use their assets to their full potential and avoid a 'rip and replace' approach when upgrading hardware. Companies need to dispose of redundant equipment through legitimate channels that follow SA's legal waste disposal requirements to avoid the growing problem of e-waste leaching toxic mercury into our groundwater. Information and communications technology companies can increasingly begin marketing their products as not just good for business, but also able to save energy throughout the business.

South African businesses need to look beyond their own carbon footprint, to include wider social and ecological impacts such as water scarcity, waste sinks, and soil health and community well-being. This systemic view means every sector needs to see the landscape in which they operate, understand the ecosystem services from which they benefit and the risks posed by changes in those ecosystems. They also need to understand how different sector's use of ecosystems impact on each other. Resulting sustainability choices then need to be built into the business model.

It is also important for individuals to look into small-scale solutions that can help SA meet its targets. Domestic solar systems and small-scale wind power stations can contribute to base load, peak load and transmission loss reduction. A middle or upper-income household can reduce its electricity consumption by up to 50% simply by installing a solar water-heater and ceiling insulation, reducing electric heating, minimising pool pump activation and investing in energy-saving lighting and efficient household appliances. The same applies to commercial buildings, institutions and industries in all sectors.

The link between the South African economy and the environment has never been stronger. Businesses are starting to see the business opportunities of the green economy and how to use it to create jobs and develop the economy.

John Gardner, founder of Common Cause, described today's energy-climate challenge as "a series of great opportunities disguised as insoluble problems." We are entering a time when everyone will have to pay the true cost of the energy they are using, the true cost of the climate change they are causing and the true cost of the biodiversity loss they are triggering. In addition, the true costs of all these things are becoming visible, measureable, assessable and inescapable. Going green is no longer a choice, fad or statement, but is now the only smart

efficient low-cost way to grow, build, design, manufacture, work and live when all the true costs are taken into account.

What we know is that high energy users, green house gas emitters and the SA economy across the board will find it challenging to meet the 34% target. We will need large investments in solar, wind and nuclear energy, and we will have to pay higher prices for our energy. We also know that more environmental regulation and global pressure is on the way. While SA faces many challenges to moving to a low-carbon economy, the long term benefits and opportunities it will open up far outweigh the short-term difficulties. It is crucial that our decision-makers in government and business act with urgency as the costs of inactions will be detrimental to development. Those who are innovative and lead the charge in transitioning their economies, invest in alternative energy and acknowledge the links between low-carbon development, job creation and poverty alleviation will be the agenda setters in the global shift to a new economic order.

An effective climate change strategy by companies should include:

- Understanding the company-specific risks and opportunities climate change poses;
- Integrating climate change considerations into the company's vision and strategy;
- A comprehensive greenhouse gas emission profile or carbon footprint;
- Setting and updating emission reduction targets;
- Identifying and implementing emissions reduction and adaptation measures;
- Integrating climate change considerations into internal governance practices, including board oversight.

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